Small Business Innovation Research/Small Business Tech Transfer

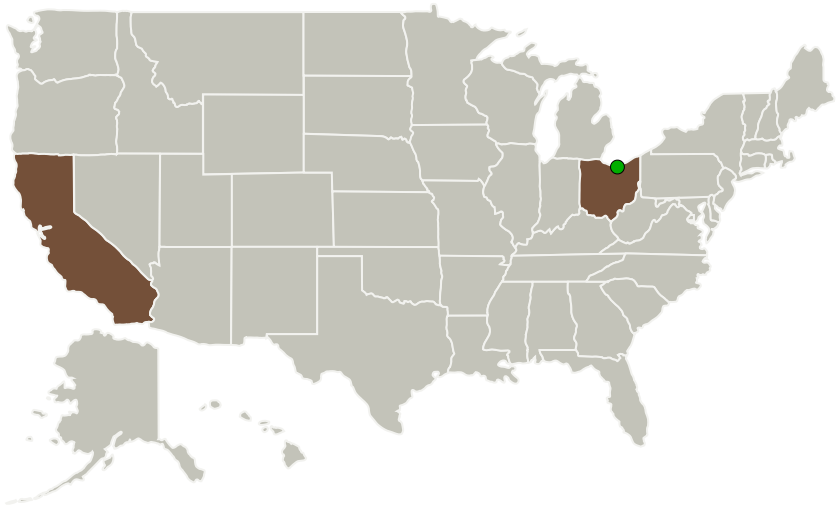
Flexible Automation for Final Assembly of Blanket Arrays, Phase I

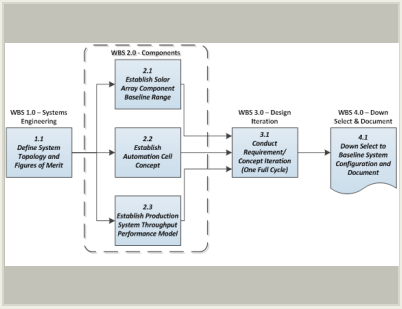
Completed Technology Project (2014 - 2014)

Project Introduction

In Topic Z1.01, NASA seeks advanced photovoltaic technologies that can deliver cost, reliability, mass, volume and efficiency gains over current solutions. Future photovoltaic systems range in size from Cubesat-class to International Space Station sized arrays. Operational domains range from low Earth orbit to interplanetary distances. Power levels may reach 100's of kilowatts operating at several hundred volts. Specific power of greater than 130 w/kg, and stowed volumes 4 times denser than the current state of the art are required. These functional parameters drive the need for large flexible blanket arrays comprised of solar cell modules assembled in myriad configurations. Manufacturers of flexible solar arrays currently use manual processes to accomplish final assembly. NASA's cost and reliability goals require new approaches to manufacturing. Building on recent successes in flexible substrate photovoltaics, our proposed effort creates a preliminary design for an automated final assembly manufacturing cell for flexible blanket solar arrays. Modular, scalable, and flexible, the proposed system incorporates the latest in machine vision, material handling, laser welding, and automated test capabilities. When fully implemented in Phase II, the system will deliver immediate return on NASA's investment through labor reductions and reliability improvements. Missions from across NASA's entire portfolio will benefit from the significant cost savings, allowing fiscal resources to be focused on the primary scientific or operational goal.

Primary U.S. Work Locations and Key Partners





Flexible Automation for Final Assembly of Blanket Arrays Project Image

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Organizations Performing Work	Role	Type	Location
VectorSum, Inc.	Lead Organization	Industry	Irvine, California
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
California	Ohio

Project Transitions

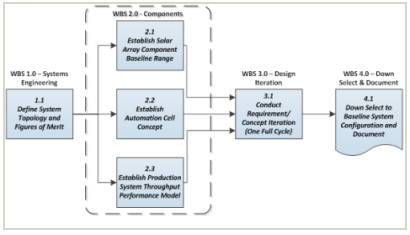
June 2014: Project Start

December 2014: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137537)*

Images



Project Image
Flexible Automation for Final Assembly of Blanket Arrays Project Image
(https://techport.nasa.gov/image/126441)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
VectorSum, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

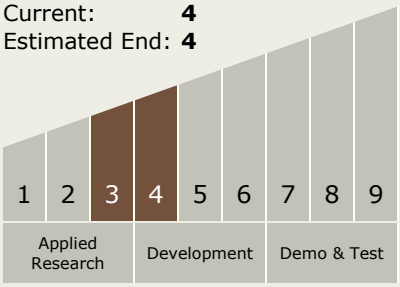
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Hugh Cook

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.1 Power Generation and Energy Conversion
    - TX03.1.1 Photovoltaic

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System